Honors Chemistry - Nature of Science Lab 3

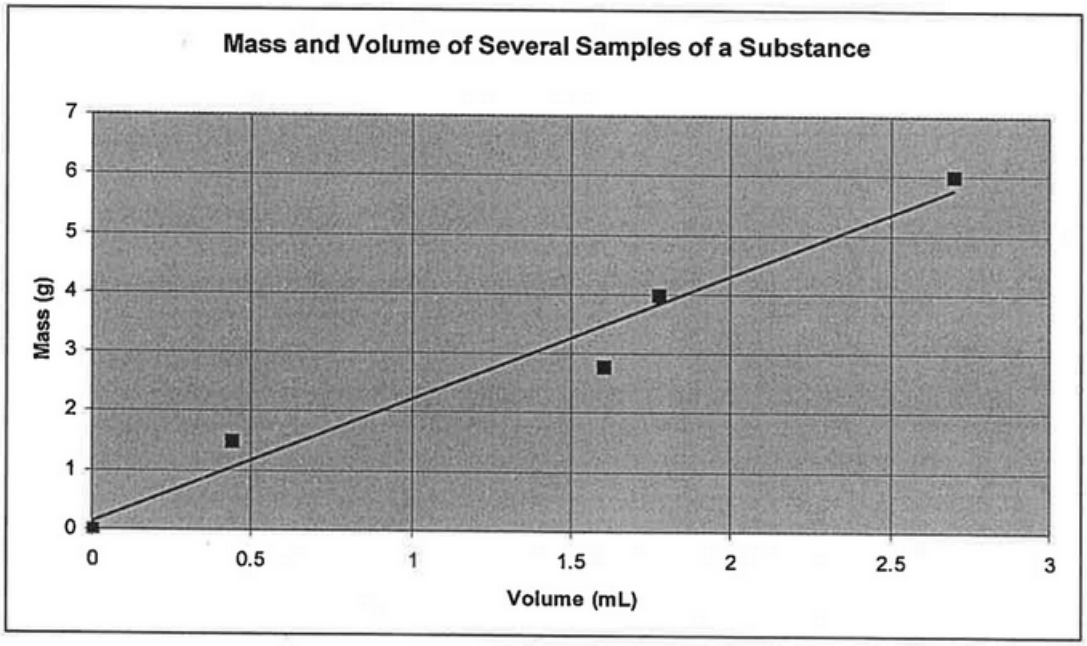
Stasya

1 Lab 3: Graphical Method for Calculating Density

Purpose: To graphically determine the density of two different substances.

Safety: Whether it's spelled out for you in this section of the handout or you have to read the procedure to determine the safety precautions, this section should always be completed.

Pre-Lab Questions:



1. Calculate the slope of the line in the graph above.
2. What does this slope represent?

Procedure:

1. Obtain samples of aluminium and steel. The samples must be clean and dry.
2. Obtain the mass of an empty beaker, and then carefully add your aluminum to the beaker. Record the new mass of the beaker + metal.
3. Use the water displacement method to find the volume of the aluminum. Fill a graduated cylinder about half-full with tap water. Record the initial volume. Very carefully add your metal sample to the graduated cylinder, trying not to lose any metal or splash water out of the cylinder.
4. Repeat steps 2 and 3 for the other metal.
5. Dry both samples.

Data and Observations:

Record the mass data and the volume data in a table.

Analysis of Data:

1. Using google sheets, create a graph of mass versus volume.
2. Don't forget to graph both your aluminum data and your steel data. Make sure they are properly labeled.
3. Note that not all of the points will lie on the line of best fit. However, approximately as many points should lie above the line as lie on the line.

Calculations:

1. Calculate the density of your group's samples by using your mass and volume measurements. Clearly show your work for each sample.
2. Determine the slope of each line you created in the analysis of data section.

Post-Lab Questions:

1. What does this experiment demonstrate about the density of a substance?
2. Do you think the density could help identify an unknown substance? Why?
3. Look up the accepted values for the densities of aluminum and steel. Calculate your percent errors by comparing your densities to the accepted values.

4. Which of the approaches used in this experiment should be more reliable and accurate: calculating the density from the mass and volume of a single sample, or calculating the density by determining the slope of the graph of mass and volume data for a number of samples? Explain your answer.

Remember to include a conclusion and error analysis in your lab report.